10 TIPS FOR TURNING DI THEORY INTO PRACTICE

By

MELISSA N. DUCEY * SHIRLEY KEY **

* Doctoral Student, University of Memphis.
** Associate Professor of Science Education, University of Memphis.

ABSTRACT

At the core of Differentiated Instruction (DI) is the belief that because all children are different, their learning needs and abilities are different, and therefore must be approached differently. Differentiating instruction allows teachers to meet the students where they are academically and bring them forward. Although one continues to grow in the use of DI, things are learned along the way that help to take the theory of DI into practice for the classroom teacher: 1) DI can extend learning beyond the standards, 2) use open-ended (divergent) questions/problems, 3) start with tiered instruction, 4) grade on learning and growth, not a knowledge checklist, 5) remember that DI can be used to help even the best and brightest, 6) be proactive, not reactive to student needs, 7) incorporate option charts and "menus," 8) avoid the common pitfalls of microdifferentation, 9) maximize meaningful, but flexible, grouping, and 10) do not expect an overnight revolution. The goal in implementing DI was to increase student performance in physics. Through the use of DI, students were more receptive to working in groups, working at their own pace, working on application-based problems, and a noticed increase in students' desire to learn.

Keywords: Differentiated Instruction, Educational Strategies, Student Grouping.

INTRODUCTION

Differentiated instruction (DI) is a classroom strategy that hails from gifted education. At the core of DI is the belief that because all children are different, their learning needs and abilities are different, and therefore must be approached differently. Tomlinson and Kalbfleisch (1998) caution that "the trouble with a one-size-fits-all classroom is that the lesson is pitched at a single-challenge level, virtually ensuring that many students will be overchallenged or underchallenged and, therefore, will not learn" (p. 54). Differentiating instruction allows teachers to meet the students where they are academically and bring them forward, whether the student is below average, average, above average or some combination thereof, depending on the topic. Edwards, Carr and Siegel (2006) advocate the use of differentiated instruction because the "students whose academic skills fall outside the 'middle' in non-differentiated, one-size-fits-all classes have fewer opportunities to learn, and hence a poorer quality of education" (p. 583).

When the researchers first heard about differentiated instruction (DI), it was at a time when they were frustrated by the extreme mix of abilities in the science classroom. The researchers hoped that DI might help, although they were certainly cautious that perhaps it was just a fad or the current buzzword. The incorporation of DI was both challenging and rewarding. Although the researchers continue to grow in the use of DI, they also learned things along the way that help to take the theory of DI into practice.

DI can EXTEND learning beyond the standards.

Teachers who consider DI implementation are probably not "teach to the test" people anyway, but there is always the pressure to improve standardized test scores. This results in a feeling that teachers should only teach to the standards. Instead, teachers are encouraged to use the standards as a starting point, but then extend the standard to include real-world applications. The speed with which students progress through the standard can be differentiated, as well as the topics chosen with regards to applications. This is especially powerful when considering the advanced students in the classroom, who probably already know a lot of the foundation of information. Their

time in the classroom can be made more meaningful by allowing them to explore practical applications of the concept rather than waste time on activities that seem mundane.

Use open-ended (divergent) Questions/Problems.

Differentiated instruction is the most beneficial when students are allowed to creatively construct their own learning within predetermined guidelines. Giving students close-ended questions turns into a fancy worksheet. Alternatively, if teachers give open-ended questions, students are allowed to take the topic where it is interesting and meaningful. One student may be particularly fascinated by one facet of a topic, where another student is intrigued by a separate facet. Both are studying the same topic, but the emphasis can be different depending on personal interests. Predetermined guidelines, preferably spelled out in a rubric or learning contract, keep the student's work appropriately focused.

Start with Tiered Instruction

The idea of DI seems daunting to the beginner who imagines 30 students, each with their trajectory of learning, creating chaos in a used-to-be-organized classroom. Although chaos and disorganization should not be realities of a good DI classroom, it is still a scary possibility. Tiered instruction is a good beginning step to DI because it allows teachers to structure the classroom in a somewhat traditional format. As the name implies, tiered instruction allows teachers to separate students by ability to complete assignments or assessments. I have found that 3 or 4 tiers is the most effective and manageable. The tiered activities can be done in groups or individually. A few word of caution: avoid using grouping too often as students in the low tiers will notice that they are "the dumb kids," ensure that assignments for all tiers are meaningful, and recognize that tiered instruction is a good step towards differentiating instruction but does not fully embrace the ideals of a true DI program.

Grade on learning and growth, not a Knowledge Checklist

This point is sometimes the hardest to embrace, as it exists between "An 'A' means that the student knows x, y, and z" and " 'A' for effort…he sure worked hard." In a traditional classroom, the "smart" kids can probably show up on day #1 and do pretty decent on the unit test. As they sit through class, minimal effort is required to earn an 'A,' while the weaker students work hard every day to simply pull off a 'C'. Instead of allowing this to go on, teachers could set a standard of growth required to earn designated grades. This would require all students to actually learn! Some students could accelerate out of units to work on application-based projects, others could learn the material with greater depth or intensity, while others have information scaled back to the minimum without losing the integrity of the content. If the idea of grading on learning instead of knowledge is inconsistent with the policy of the local school system, individual teachers may still be able to include this idea by making a portion of the final grade reflect growth.

Remember that DI can be used to help even your best and brightest!

In today's No Child Left Behind reality, teachers and administrators have inadvertently created a "No Child Gets Ahead" situation. Too often, the advanced learners are held back as the classroom teacher struggles to keep the weaker students on track with the impending standardized test. Many gifted students are ignored because they score high on standardized assessments, and these scores are interpreted at learning, when in reality, these students have probably learned the least in the course of a year of traditional instruction (Winebrenner, 2000). Often, advanced learners are asked to take on the role of peer tutors to the struggling students, which does very little for the advanced students' knowledge growth. Instead, include creative options for the advanced learner, including acceleration, curriculum compacting, and application option charts and menus. Labeling a course as "Honors" or "AP" is just another one-size-fits-all approach, just geared towards a smaller range of abilities (Dixon, 2006).

Be proactive, not reactive to Student Needs

Differentiated instruction is just as much of an attitude of teaching as it is a way of teaching. Part of this attitude is a

genuine belief that because all students learn differently that we must somehow teach them differently. In a traditional classroom, a teacher will assign work, only to discover that, a few selected students finish quickly and a few others struggle immensely. Upon observing this, the only thing the teacher can do is react to the differences, assigning "filler" work to some and telling others to "just finish it for homework." A DI teacher embraces the differences before the unit begins, and has plans in place to accommodate for those differences throughout the unit. Differentiated instruction is planned and purposeful. It includes traditional, whole-group activities, mixed with differentiated individual or small group activities. DI teachers build time for differences in the way they construct the units.

Incorporate Option Charts and "menus"

Option charts and menus require a lot of advance teacher preparation, but are incredibly powerful. Student have incredible flexibility in choosing topics or projects that are personally meaningful, but also know that their direction has been approved. These charts and menus should include a rubric for grading, but this rubric must be rather general to accommodate for the variety of options. Teachers can propose a variety of charts, including topics by learning style (multiple topics, each with an option of expressing knowledge using a different learning style), topics by difficulty, or learning style by difficulty. Menus can include options for topics, knowledge acquisition, and knowledge presentation (Figure 1).

Topic (Choose 1 or 2)	Knowledge Acquisition (choose at least 2 to actually use)	Product
___Nuclear Energy ___E85/Biodiesel ___Solar Energy ___Hydroelectric ___Petro-fuels (coal, oil, etc.) ___Other (Please list: _____)	___Internet ___Journal/Newspaper Articles ___Encyclopedias (hard copy or virtual, i.e. Encarta) ___Professionals in field ___Other (Please list: _____)	___Research Paper ___PowerPoint ___Video ___Demonstration ___Lecture/Discussion ___Other (Please explain: _____)

Project: For this quarter, you are going to research energy sources. You can research something that is widely used or research something that is less common. Although people debate over the urgency to employ alternate energy options, scientists recognize the need to begin to research and use smarter energy options (and to use our current energy sources smarter also).
For the energy source that you pick, research at least the following ideas:
-what is it? How is it generated/used, etc?
-how efficient is it? (energy efficiency AND cost efficiency)
-what are the benefits? Disadvantages?
(if you find other ideas related to your topic, you can certainly include it)

Figure.1 Option Charts and Menus.

Avoid the pitfalls

Acknowledging student differences is one thing, using differentiated instruction is something else. Some common pitfalls associated with simply acknowledging student differences include asking hard vs. easy questions, adjusting quantity of work, grading some students harder than others, or using fixed groupings where students become embarrassed by always being in the low ability group. These strategies are known as microdifferentiation, and are just attempts to make a one-size-fits-all curriculum fit a little better (Tomlinson, 2001, 1998, 1995). Please note that in point #3, it is suggested to START with tiered activities, but it does not represent the full meaning of differentiated instruction. It is important to have a good starting place, but it is also important to move past that point.

Maximize meaningful, but flexible, grouping

Meaningful grouping is a way to avoid having 30 different student projects occurring simultaneously. Students can be grouped homogenously (similar traits) or heterogeneously (varying traits). Students can be grouped according to ability, learning style, interest, or personality. The researchers recently grouped students according to personality for a lab activity. It was noticed that in some groups, there was a clear leader who took over the lab for everyone else (deemed the "smart leaders"). This created a population of students who were smart enough to do the lab, but could not get a word in edgewise ("quiet doers"). Also, the researchers had students who were smart enough, but sat around waiting for someone to do the lab for them ("coat-tail riders"). For a final personality type, the researchers noticed the students who were active in the lab, but still struggled with the concept ("struggling doers"). Lab groups were created where all the "smart leaders" were together (and away from everyone else). The researchers also put together the "coat-tail riders" and the "struggling doers," knowing that the "coat-tail riders" would not allow the others to do the lab incorrectly, thus all would have to participate. Finally, all the shy "quiet doers" were put together to allow new leaders to emerge. This creative grouping worked really well in lab environments.

Do not expect an overnight revolution

It will be difficult to change the way the instruction occurs. It cannot be expected to do a massive overhaul of a traditional classroom and turn it into a DI classroom in one semester or year. Instead, integrate one or two activities per unit that are differentiated. Each year, add a little more until a full DI unit is achieved. It is also important to remember that students will struggle with DI. By high school, students are formatted to show up and follow the check list to get an 'A.' Students generally do not know how to work in a student-centered environment because they are nervous about "doing it right." This is especially true if one teacher in a school takes on DI outside of a school-wide initiative. It will take time to develop a classroom where both the students and teachers are comfortable.

Conclusions and Implications

The goal in implementing DI was to increase student performance in physics. Student performance obviously includes the summative assessments at the end of units, but can also include classroom engagement and quality of in-class learning. Although no trends were observed in summative assessment performance, marked trends occurred for in-class learning. Through the use of DI, students were more receptive to working in groups, working at their own pace, and working on application-based problems, as measured through a simple Likert-style questionnaire. Through the use of student journals, there was a noticed increase in students' desire to learn. Where entries at the beginning of implementation were short and vague, students began to realize the value of that form of communication between themselves and the teacher and asked questions regarding what they were unsure of or had interests in. The students wanted ownership of their learning, as demonstrated in the journal entries and also in the questionnaire results. They may not want to be totally self-instructed, but they want some flexibility in their learning when it comes to working in groups rather than whole-class instruction or in the nature of the group activities. As a teacher of a college-prep course, care was taken to balance activities that are beneficial to the students according to instructional theory with teaching styles that will commonly be found at the undergraduate university level, particularly in science. If students become too acclimated to group and project work, they might be unprepared for the reality of lectures halls full of dozens of students who must do a significant amount of learning between classes to stay with the professors' demanding syllabi.

The researchers believe that differentiating instruction is a successful teaching strategy. Although planning for DI is time consuming, the learning that occurs is more meaningful and student-owned. Student engagement dramatically improves, which may ultimately lead to increased scores on summative assessments. Students become more receptive to a variety of learning strategies that will allow teachers to integrate more student-chosen problems. Moving from the traditional to a true differentiated classroom is a commitment that must occur over time. This is particularly true for juniors and seniors in high school who are accustomed to traditional forms of instruction, and do not respond well to drastic changes in instruction where very few guidelines are 'spoon-fed' but are instead student-selected.

References

[1]. Dixon, F. (2006). Differentiating instruction in AP: an important question? Or, out of the question? *Gifted Child Today, 29*(2), 50-4.

[2]. Edwards, C.J., Carr, S. & Siegel, W. (2006). Influences of experiences and training on the effective teaching practices to meet the needs of diverse learners in schools. *Education, 126*(3), 580-92.

[3]. Tomlinson, C.A. (1995). Deciding to differentiate instruction in middle school: one school's journey. *Gifted Child Quarterly, 39*(2), 77-87.

[4]. Tomlinson, C.A. (1998) For integration and differentiation choose concepts over topics. *Middle School Journal, 30*(2), 3-8.

[5]. Tomlinson, C.A. (2001) *How to differentiate instruction in mixed-ability classrooms* (2nd ed.). Alexandria, VA: Associate for Supervision and Curriculum Development.

[6]. Tomlinson, C.A. & Kalbfleisch, M.L. (1998). Teach me, teach my brain: a call for differentiated classrooms. *Educational Leadership, 56* (3), 52-55.

[7]. **Winebrenner, S. (2000).** Gifted students need an education, too. *Educational Leadership, 58*(1), 52-56.

ABOUT THE AUTHORS

Melissa N. Ducey is a Doctoral Student at the University of Memphis and a practicing Science Teacher in a surrounding school District.

Dr. Shirley Key is an Associate Professor of Science Education at the University of Memphis. She currently serves as the Director for the Secondary Program and the Middle School Program. Her research focuses on the achievement of under represented students in science using the inquiries: student's culture, cognitive processes, technology and pre-service and in-service students' education.